Waterloo Bridge to 2020

UNDERGRADUATE LEARNING

Issue Paper
May 2018

UNIVERSITY OF WATERLOO

Contents

Acknowledgements

The Undergraduate Learning Issue Paper Advisory Group, one of seven groups formed to provide context for discussion and consultation as the University of Waterloo develops its Strategic Plan for 2020-2025, prepared this issue paper.

The following individuals provided the insight, time, and effort to put this issue paper:

Advisory Group Members: Mario Coniglio (Chair, Associate Vice-President, Academic), Carey Bissonnette (Faculty of Science), Aldo Caputo (Centre for Extended Learning), Andrew Clubine (Federation of Students), Tara Collington (Faculty of Arts), Peter Douglas (Faculty of Engineering), Donna Ellis (Centre for Teaching Excellence), Anne Fannon (Professional Development Program), Leeann Ferries (Faculty of Applied Health Sciences), Matthew Gerrits (Federation of Students), Ross Johnston (Co-operative Education), Carrie Mitchell (Faculty of Environment), Francis Poulin (Faculty of Mathematics), Judene Pretti (Waterloo Centre for the Advancement of Co-operative Education), Heather Westmorland (Student Success Office)

Supports: Jana Carson (Institutional Analysis and Planning), Annamaria Feltracco (Institutional Analysis and Planning), Jodi Koberinski (Writer), Daniela Seskar-Hencic (Institutional Analysis and Planning), Kari Weaver (Library)

Data and evidence support: Rohem Adagbon and Kerry Tolson (Institutional Analysis and Planning)

Editing: Cherise Carlaw, George Choy, Annamaria Feltracco (Institutional Analysis and Planning)

The Advisory Group gratefully acknowledges the specific contributions of the following individuals to the paper:

Content, editing and writing support: Aldo Caputo, Mario Coniglio, Donna Ellis and Anne Fannon

Literature review and synthesis: Kari Weaver

Writing: Jana Carson, Annamaria Feltracco

Executive Summary

Our environmental scan of best practices in teaching and learning at the post-secondary level confirms that Waterloo is doing well on a number of fronts. Many ongoing practices that promote deep learning for our students emerge from individual Faculties through a host of initiatives, for example, senior capstone projects, problem-based learning, incubators, implementation of a large variety of technologies to support teaching and learning, and so on. Centrally, the work of our Centre for Teaching Excellence (CTE) has been instrumental in awareness building and special programming for instructors in course design, assessments and high impact practices (HIPs), etc.

Our co-operative education program is widely recognized as being our most impactful HIP. At Waterloo, co-op adds value to the learning experience at a scale that no other institution can match. There is promise that the fledgling EDGE certificate will also provide additional value to the learning experience for students who do not participate in co-op. However, experiential education is more than simply co-op and EDGE on this campus, and the broader spectrum of experiential education is an integral part of many of our academic programs (e.g., internships, labs, clinics, capstone courses, etc.). In select programs, experiential education is built into the curriculum design and intentionally scaffolded throughout a student's degree program. In other instances, individual faculty members include experiential learning activities in their courses as part of their pedagogy to enhance student learning and motivation.

The competitive landscape for the best undergraduate students means that Waterloo cannot afford to rest on its laurels. Within higher education, the dominant paradigm continues to focus on teaching while there is an ongoing and increasing push to focus on learning. As an institution, Waterloo appears ready to make a transition from operating within a *teaching paradigm*, where the focus is on what teachers do, to the *learning paradigm*, where the focus is on what learners do. This is where we need to go as an institution. While some of our individual faculty members have already made this transition, for widespread adoption to happen so that we can call this the norm at Waterloo, many more changes in individual practice and institutional support need to occur. Moreover, as more post-secondary institutions seek to provide experiential learning opportunities (especially the set of experiences referred to as Work Integrated Learning or "WIL"), Waterloo will need to determine how to maintain its world leadership in co-operative education and how to effectively educate policy makers on the important quality indicators associated with work-integrated learning.

We propose an **institutional vision statement for learning**… *Waterloo as a university where learning is powered by curiosity, informed by research, and transformative in practice.*

Adopting five evidence-based principles of effective teaching that are particularly relevant to Waterloo's context will enable us to achieve the learning process as characterized in the vision statement. At Waterloo, effective teaching (1) uses alignment in course and curriculum design; (2) fosters motivation; (3) embodies inclusivity; (4) encourages deep learning; and (5) enables lifelong learning.

A sampling of Waterloo's strengths and challenges is provided to help understand the current institutional context before we share ideas for specific initiatives that would allow us to achieve the aspirations of the vision statement for learning. These initiatives can be distilled into five strategic priority areas: (1) teaching and curricular innovations to encourage creativity; (2) student-led initiatives to empower our students; (3) assessment of learning to provide positive

and productive learning experiences; (4) institutional infrastructure, policy, and practice to promote quality and remove barriers to flexibility; and (5) advancing experiential education as an integral part of the Waterloo experience. This issue paper concludes with a selected list of proposed initiatives as a starting point for a more in-depth discussion of each of the five strategic priority areas.

1.Introduction

The University of Waterloo has developed a series of issue papers on seven topics as part of the evidence-gathering process for the development of the 2020-2025 Strategic Plan. This issue paper is focused on the topic of undergraduate learning, and the process and methodology for creating this paper is described in Appendix A. Two closely-related issue papers focus on Graduate Studies and the Learning Environment, the latter addressing aspects of the university experience that occur outside of the classroom. These issues papers are the first steps in the broad consultation process that will inform the next Strategic Plan.

The specific purpose of the Undergraduate Learning paper is to provide a foundation to stimulate a campus-wide discussion on promising practices and possible future directions for enhancing the undergraduate learning experience at Waterloo. This paper draws from the recently produced Teaching and Learning Report, the Issue Paper Advisory Group members' feedback, as well as consultation with other key stakeholders in experiential education and the Faculties. The paper aims to be forward-thinking and begins by presenting a vision for teaching and learning at Waterloo, then outlines some of our current strengths and challenges in relation to that vision, and suggests some promising practices for enhancing the undergraduate learning experience at Waterloo. The paper ends with a set of questions for the community to consider in the consultations for the 2020-2025 Strategic Plan consultation process. While the focus of the current report is on undergraduate learning, many of the ideas expressed in this document are also applicable to varying degree to graduate studies, especially as course-based master's degrees increase in number.

2.The Future of Teaching and Learning at Waterloo[1]

The research literature has identified a continuum of approaches to education: from putting the primary focus on teachers and their teaching to focusing on learners and their learning (Barr & Tagg, 1995; Prosser & Trigwell, 1999). Within higher education, the dominant paradigm continues to focus on the former (teaching) while there is an ongoing and increasing push for the latter (learning) (Christensen Hughes & Mighty, 2010). In the Association of American Universities Framework (AAUF) document (2013), the association's president encourages faculty members to "use student-centered, evidence-based, active learning pedagogy in their classes". As an institution, Waterloo is well poised to make the transition from operating within a *teaching paradigm*, where the focus is on what teachers do, to a *learning paradigm*, where the focus is on what learners do (Barr & Tagg, 1995). A number of our instructors[2] have already made this transition, and some departments and programs have moved further along this path than others, but for more widespread adoption to occur, many more changes in individual

[1] This section stems primarily from the "Final Report: Input on the Future of Teaching and Learning at Waterloo, April 13, 2018" (identified above as the Teaching and Learning Report), which is a report that resulted from four half-day retreats in Fall 2017 and Winter 2018 involving senior staff from four academic support units that report to the Associate Vice President, Academic (Centre for Teaching Excellence, Centre for Extended Learning, Writing and Communication Centre, and WatCACE). The authors of this report are referred to as the Teaching and Learning Working Group. Some additions to the original report were made by the Issues Paper Advisory Group members.

[2] The term "instructor" is intended to include all who teach at Waterloo: faculty members, lecturers, staff instructors, sessional instructors, and teaching assistants.

practice and institutional support are needed. For the upcoming strategic planning process, we recognize the need to support the shift to a learning paradigm while also starting from a more familiar focus on teaching. As such, the focus for the next plan must be on effective teaching that promotes meaningful learning, which is described in the vision statement shared later in this section.

To assist in clarifying both effective teaching and learning, the Teaching and Learning Working Group adopted broad and conceptually simple definitions from the research literature, which are also being used in this issue paper. **Effective teaching** is defined as being "oriented to and focused on students and their learning" (Devlin & Samarawickrema, 2010, p.112). In essence, effective teaching focuses on the process of learning, and it puts the primary emphasis on the learners rather than the teachers. **Learning** is defined as "a process that leads to change, which occurs as a result of experience and increases the potential for improved performance and future learning" (Ambrose et al., 2010, p.3). Learning includes making sense, acquiring knowledge or skills, altering perspectives, and so on.

From these fundamental definitions and background literature, the Teaching and Learning Working Group developed an **institutional vision statement for learning**:

> *We envision Waterloo as a university where learning is powered by curiosity, informed by research, and transformative in practice.*

To achieve learning as characterized in the vision statement, we need effective teaching. The Teaching and Learning Working Group identified five evidence-based principles of effective teaching that are particularly relevant to Waterloo's context which we believe need to be encouraged, supported, and celebrated over the next number of years.

a. Evidence-based principles of effective teaching at Waterloo

At Waterloo, effective teaching:

- *Uses alignment in course and curriculum design*
- *Fosters motivation*
- *Embodies inclusivity*
- *Encourages deep learning*
- *Enables lifelong learning*

These five fundamental principles need to exist in an environment where the institution's senior administrators, academic support staff, instructors, and students demonstrate a commitment to effective teaching.

These principles of effective teaching involve both means and end goals, and they all require instructors to engage in certain processes to achieve them. How each principle can be achieved through teaching is briefly described:

Alignment in design occurs when outcomes that are focused on learning are made explicit for learners in courses and programs, the assessments of learning match the outcomes, and course-related activities prepare learners for the assessments (Biggs & Tang, 2007).

Motivation occurs when learning experiences, inside and outside the classroom, are relevant and of value to learners, provide them with choice, and feel achievable yet appropriately challenging (Svinicki, 2004).

Inclusivity occurs when learning environments and experiences engage learners with differences respectfully and in a caring manner, and are designed to enable all to learn (Ouellett, 2005).

Deep learning occurs from experiences that encourage learners to make connections, apply knowledge in new contexts, engage in learning activities and analytical thinking on their own and with others, and retain their learning (Christensen Hughes & Mighty, 2010).

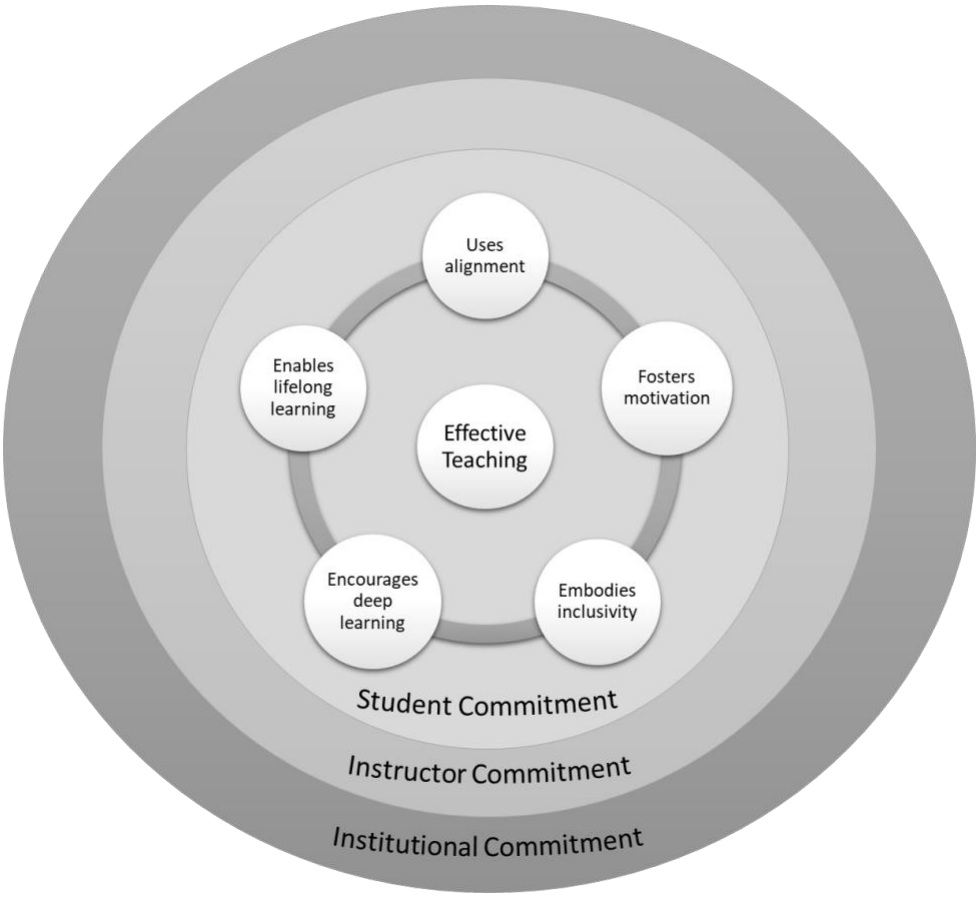
Lifelong learning occurs from experiences that teach students to think about their thinking, become self-aware as learners, take responsibility for their learning, and self-assess their learning (Yancy McGuire, 2015).

The application of these principles in a widespread manner is more likely when all of the involved stakeholders commit to them and work in concert to achieve success. More specifically:

1. **Institutional Commitment** stems from **senior administrators** who promote a culture that values effective teaching through articulating its importance, and expecting, enabling, and rewarding its implementation. In addition, **staff members** who support instructor development and student learning help to demonstrate this commitment at the institutional level (Association of American Universities, 2013).
2. **Instructor Commitment** is present when instructors recognize themselves as learners, regularly review courses/programs and their instructional practices to improve, share research-informed best practices with colleagues, and seek assistance when needed (Weimer, 2010). Their commitment is also apparent when their actions are consistent with caring for their students' welfare and they have reasonable expectations of their students.
3. **Student Commitment** is shown when they engage effectively as learners and seek to demonstrate their curiosity, interest, and abilities in the process of learning.

The principles of and commitments to effective teaching can be conveyed in the visual model shown in Figure 1.

Figure 1: Effective Teaching to Promote Learning at Waterloo



The members of the Teaching and Learning Working Group and the Issue Paper Advisory Group recognize that this model of effective teaching needs to be implemented within the Waterloo context in order to continue the journey towards the wide adoption of a learning paradigm. The next two sections of this paper describe elements of the Waterloo context regarding strengths and challenges related to teaching and learning. The examples identified are not meant to be comprehensive; rather, they provide a top-of-mind perspective. The paper ends by exploring promising practices both here and elsewhere and identifying questions to encourage deeper discussion.

3. Waterloo's strengths in teaching and learning

The Advisory Group provided their perspectives on Waterloo's strengths that would support further movement towards the adoption of a learning paradigm. The listing below is grouped thematically and is not intended to be hierarchical.

a. High-performing and engaged students

- Waterloo attracts exceptional students. Three out of five (60.6%) of Waterloo's undergraduate students had an entering average of 90% or greater in fall 2016 (Strategic

Plan in Action, n.d.). What this means is that students attending Waterloo have accomplished, bright peers with whom to work, learn, and establish friendships.

- In their courses, 61% of Waterloo's fourth-year student respondents report having participated in an average of two High Impact Practices3, compared to just over half (52%) in Ontario (National Survey of Student Engagement (NSSE), 2017). More instructors at Waterloo are including HIPs into their pedagogy, many assisted by staff in our academic support units (e.g., Centre for Teaching Excellence, Student Success Office, Writing and Communication Centre, Library). Many ongoing practices that promote deep learning for our students emerge from individual Faculties through a host of initiatives, for example, senior capstone projects, problem-based learning, incubators, implementation of a large variety of technologies to support teaching and learning, and so on. Such high impact practices have repeatedly and consistently proven their worth in terms of their transformative educational value, and in terms of important metrics such as student graduation rates.
- Students engage in capstone courses in many of our programs to integrate, in a comprehensive way, their prior learning in their programs to create new higher level understanding of their areas of interest and, in many cases, to test the waters for considering graduate studies. Waterloo students also engage in opportunities to explore how to link learning activities to skills required in the workplace, such as through WatCV, a suite of assignments that help them connect course work to skills required in the workplace.
- Outside of courses, students engage in opportunities to pursue their curiosity and develop leadership skills through an astonishingly wide range of co-curricular initiatives, including entrepreneurship (e.g., Velocity), student clubs, senior research projects, tutor training, Engineering design teams, math contests, hackathons, and other activities.

b. Experiential education

- Experiential education has been a foundational component of education at Waterloo from its inception. Annual co-op work terms have surged from 13,000 in 2007 to over 21,000 in 2017 (Performance Indicators, Co-operative Education, 2017). The infrastructure to support this level of activity is staggering, and it is no surprise that co-operative education at Waterloo adds value to the learning experience at a scale that no other institution can match.
- Waterloo co-op students are enrolled in 120 different academic programs, and they work with 6,700 employers in over 60 countries. In 2017/18, 60% of full-time undergraduate students were enrolled in a co-op program (Performance Indicators, Co-operative Education, 2017). It's hard to overstate the value of co-operative education to Waterloo's reputation. When asked, 70% of incoming student survey respondents indicate that they would not have come to Waterloo if not for co-op (Marketing and Undergraduate Recruitment, internal data).

---

[3] High Impact Practices (Kuh, O'Donnell, & Schneider, 2017) are teaching and learning practices that have been shown to be beneficial for post-secondary students. High Impact Practices include: first-year seminars and experiences, common intellectual experiences, learning communities, writing and inquiry intensive courses, collaborative assignments and projects, undergraduate research, diversity / study away / global learning, service learning, community-based learning, internships and field experiences, capstone courses and projects, and e-Portfolios.

- The recently created EDGE certificate will provide additional value to the learning experience for students who do not participate in co-op programs.
- There is recognition, both internally and externally, that experiential education is more than co-op and EDGE on this campus, and the broader spectrum of experiential education is an integral part of many of our academic programs (e.g., internships, labs, clinics, capstone courses, etc.). In select programs, experiential education is built into curriculum design and intentionally scaffolded throughout a student's degree program. In other instances, individual faculty members include, as part of their pedagogy, experiential learning activities in their courses to enhance student learning and motivation.
- Students learn and practice foundational skills like teamwork, time management, communication, and leading others outside of the classroom through our array of mentorship experiences such as teaching assistantships, peer success coaching, orientation leadership, working as residence dons, and so on, often supported by staff in our academic support units.

c. Growing capacity for culture change

- Waterloo has, in recent years, been able to grow its faculty complement more aggressively than many other Canadian universities, hiring an average of 71 faculty members per year since 2012 (Performance Indicators, Hires by Gender, 2017). New hires with a passion for teaching bring energy to their courses and to their academic colleagues.
- The Teaching Fellows Program exists to mentor and stimulate teaching development and innovations. Each Faculty participates in the program and regular meetings of the teaching fellows result in discussions of challenges as well as the sharing of best practices across the institution.
- Waterloo has committed through the Undergraduate Communications Outcome Initiatives to enhance the communication skills of all of its undergraduate students.
- An increasing number of courses include active learning strategies and more diversity in student assessment practices, including two-stage testing. Professional development opportunities, such as faculty communities of practice and an annual teaching and learning conference, are facilitated by the Centre for Teaching Excellence (CTE) to assist with sharing research and best practices.
- An increasing number of programs have re-designed curricula and now include capstone courses in the senior year.

d. Teaching and learning resources in place

- The CTE collaborates with individuals, academic departments, and academic support units to foster capacity and community around teaching and to promote an institutional culture that values effective teaching and meaningful learning. From 2011 to 2017, more than 6,000 faculty members, staff instructors, and graduate students have engaged with CTE's services (Centre for Teaching Excellence External Review Self Study Report, 2017). CTE is currently working towards a number of strategic priorities that align with the principles for effective teaching described in this issue paper.
- The Centre for Extended Learning (CEL) supports the design, development, and delivery of online courses. Through their partnership with course authors and departments, they support effectiveness and innovation in online teaching and learning. Waterloo has one

of the largest and most well-supported online programs in Canada, which positions us as a leader in the ability to provide flexible and far-reaching learning options sought by today's learners.
- Librarians across the University partner with faculty and students to enhance critical and creative thinking in curricular and co-curricular settings with a focus on information-seeking skills, evaluation, information ethics, and increased context for disciplinary and interdisciplinary information, supporting student growth in both one-on-one and group sessions.
- The Student Success Office (SSO) works closely with the faculties and campus partners to support academic and personal development as well as to promote a smooth transition for new students. The focus is on enhancing students' awareness of their learning strengths and challenges, their ability to meet learning expectations and adapt to new environments, and their ability to seek out and access relevant resources that enhance their student experience.
- The Writing and Communication Centre (WCC) provides student-centred support which includes helping students identify and articulate learning goals as part of their writing process in both one-on-one and group sessions.

e. Technology and infrastructure in use to support learning

- In general, technology is becoming an increasingly important component of the learning ecosystem, and the proper tools can make learning more engaging and effective. All Faculties use technologies that include the learning management system, technologies to support blended courses and flipped classrooms, and various types of engagement tools.
- Blended courses and flipped classrooms are becoming more common at Waterloo, and more student-centred pedagogies, such as problem-based learning and team-based learning, are being used in some courses and programs.
- The University of Waterloo makes over 375 fully online courses available, as well as over 22 fully online programs, leading the U15 group of universities. The CEL supports over 515 reoffers each year, many of which involve direct interaction with and support of the instructor. CEL is involved in 40-60 development projects each year, supporting faculty with expertise in instructional design and innovative content creation (CEL, internal data, 2018).
- Mathematics has contributed significantly to the development of Möbius, a STEM-aware course development software. In addition, Engineering, Mathematics, and Science use electronic marking programs (e.g., Crowdmark, MarkBox) to facilitate faster feedback for students.
- Waterloo has committed to intensifying the rate of classroom renovation, and has struck a Teaching and Learning Spaces Committee to inform the design and use of classroom spaces. Plans include providing more classroom spaces to support and facilitate active learning pedagogies involving student-to-student and student-to-instructor interactions.

4.Challenges in teaching and learning

The Undergraduate Learning Issue Paper Advisory Group also considered challenges related to moving towards a learning paradigm, where student learning is powered by curiosity, informed by research, and transformative in practice. As in the previous section, the listing below is grouped thematically and is not intended to be hierarchical. Each theme heading represents a

challenge or obstacle in Waterloo's current context. To move successfully towards a learning paradigm, these need to be addressed; as such, the examples below each theme are phrased as opportunities to consider for future action.

a. Ensure that teaching is valued

- Contemplate how to best balance and reward the dual roles of teaching and research in a research-intensive university to encourage time and attention to both. Indeed, teaching and research can reinforce each other.
- Update hiring, tenure, and promotion policies so that an individual's teaching ability is a priority area for evaluation.
- Consider a teaching faculty stream that is parallel to the established (assistant, associate, and full professor) stream and that has the same opportunities for career advancement as well as sabbaticals.

b. Encourage students to take risks as learners

- Consider how current assessment models can include low-stakes learning opportunities and encourage deep learning.
- Support students' willingness to pursue their curiosity through competition, collaboration, and opportunities to learn from real-world experience.
- Consider how best to support student risk-taking with regards to their learning.

c. Break down structural barriers

- Strive for classroom design that promotes and supports various kinds of pedagogies, including active learning.
- Employ additional new ways to increase awareness of teaching successes and good practices across the university.
- Consider how to support deep learning in a funding environment that incentivizes increases in enrolment.
- Explore how to allow for instructor flexibility and choice in learning technologies, while minimizing confusion and the learning curve for students.

d. Bring together communities

- Waterloo has many different sub-communities within the larger student community (e.g., co-op students and regular students, entrepreneurial students and non-entrepreneurial students, STEM students and arts and humanities students, etc.). Consider how to create opportunities for integration and a sense of overall belonging to one institution.
- Acknowledge the unique features of Waterloo's alternating co-op / on-campus schedule, which require creative approaches to building campus community.
- Be aware of how articulated institutional priorities (e.g., co-op, entrepreneurship) may affect a student's sense of belonging if they are not part of those specific programs.
- The Affiliated and Federated Institutions of Waterloo (AFIW – includes Renison University College, Conrad Grebel University College, St. Paul's University College, and St. Jerome's University) add valuable dimensions to the University of Waterloo. The AFIW teach numerous Waterloo students and therefore need to be engaged and supported appropriately in all discussions regarding teaching and learning.

e. Maintain our leadership in experiential learning

- Within the Canadian higher education landscape, significant attention is being paid to the importance of experiential education (EE), particularly the sub-set of EE known as work-integrated learning (WIL). The Ontario Ministry of Advanced Education and Skills Development, the Business/Higher Education Roundtable, and Employment and Social Development Canada are leading and/or funding major initiatives designed to ensure that more Canadian students have an experiential or work-integrated learning experience before graduation. In response, more post-secondary institutions are seeking to provide these sorts of learning opportunities to their students including co-op work terms, community-engaged experiences, and applied research projects. During this time of intense focus on WIL, Waterloo will need to determine how to maintain its world leadership in co-operative education and how to effectively educate policy makers on the important quality indicators associated with work-integrated learning.

5. Promising practices

With Waterloo's context explored, it is helpful to consider concrete ways in which Waterloo may move forward. Various sources were used to identify new and creative ideas for Waterloo. The Teaching and Learning Working Group began this work by identifying specific initiatives that would allow us to achieve the aspirations of the vision statement for learning, and they distilled these into thematic strategic priority areas. The Issue Paper Advisory Group added to this work, as did reports from the Educational Advisory Board solicited for this issue paper. From these sources, **five strategic priority areas** have been identified for further consideration.

a. Teaching and curricular innovations to encourage creativity

- Launch a teaching and learning incubator. Bring together multiple stakeholders (instructors, staff, and students) to address how to implement priority areas and/or transform courses/programs (e.g., experiential learning, interdisciplinary learning on wicked problems, Indigenization, writing across the curriculum) (Parker, 2010; Reybold & Halx, 2012).
- Develop a secondment/exchange program for instructors to learn about teaching and learning strategies in use at Waterloo or elsewhere.
- Encourage students to seek breadth in their education by reducing the risk of stepping out of their disciplinary areas, for example, by implementing pass/fail for certain types of courses.
- Following the University of British Columbia (UBC) model, make a clear institutional commitment[4] to shifting to the learning paradigm. UBC did this by starting a teaching and learning enhancement fund to support innovative teaching strategies, funded in part through student tuition. This commitment was re-energized through another $12M

[4] Recently, Waterloo's Science Faculty established the "2019 Dean's Undergraduate Teaching Initiative Fund" to support teaching and learning initiatives that will help transform the undergraduate educational experience in Science. Although it is only for one year, this initiative sends a powerful message to the Science community about the importance of teaching and learning innovations in that faculty, and, provides significant resources to effect change.

investment by a foundation, and led by the Faculty of Science (Education Advisory Board, UBC, 2018).

b. Student-led initiatives to empower our students

- Set up systems for prior learning assessment in programs and student-led individually-created courses (see https://www.ed.ac.uk/employability/slicc).
- Develop a mentoring program to pair fourth year students with first year students re: doing research (could be part of EDGE program and/or co-op program).
- Assist faculty in incorporating relevant experiences of students (co-op or EDGE) to enhance the value of their courses.

c. Assessment of learning to provide positive and productive learning experiences

- Support and resource replacement of high-stakes final exams, particularly in first-year courses.
- Implement more broadly two-stage tests, as currently being done at UBC and in some programs at Waterloo, where students first complete an exam independently and then work together in groups of three or four to retake the exam collectively (Education Advisory Board, UBC, 2018) (Jang et al., 2017).
- Help faculty identify essential course requirements and multiple ways for students to demonstrate them (universal design for learning) (Warrington, 2017).

d. Institutional infrastructure, policy, and practice to promote quality and remove barriers to flexibility

- Expand evaluation practices to enable instructor risk-taking and expect professional development in teaching and learning.
- Commit to providing infrastructure to foster active learning – for example, flexible classrooms (low tech) and active learning classrooms (high tech) – especially for high enrollment courses (Mitchell, Petter, & Harris, 2017). Carnegie Mellon University (CMU), the University of British Columbia (UBC) and Wilfrid Laurier University (WLU) have made significant progress in incorporating active learning practices, including in large lecture halls. (Education Advisory Board, CMU, 2018) (Education Advisory Board, UBC, 2018) (Education Advisory Board, WLU, 2018)
- Commit to an agile, technology-enabled learning ecosystem that supports student-centred learning experiences, the creation and adoption of high-quality open content (low or no cost), and flexible learning options (Hall Giesinger et al., 2016).

e. Advancing experiential education as an integral part of the Waterloo experience

- Provide resources to support faculty in implementing a full spectrum of experiential education opportunities within the curriculum.
- Intentionally incorporate experiential education in new program design and assessment (e.g., program reviews) (Celio, Durlak, & Dymnicki, 2011; Berg, Lee, & Buchanan, 2016).
- Identify efficient ways to track the types and extent of experiential education happening across the institution.

6. Questions for the community

Consultations for the next strategic plan should be informed by our existing context and ideas for the future. Engaging with the community, listening to and critically assessing feedback will be instrumental in developing our new strategic plan. Responses to the questions posed will provide insights into how we move measurably and deliberately to a learning paradigm at University of Waterloo.

a. Primary questions

1. Are the aspirations and ideas in this issues paper on target?
2. How can the university demonstrate commitment to an approach to learning that is powered by curiosity, informed by research, and transformative in practice?
3. In your role, how do you see this approach to learning coming to life?

b. Secondary questions

1. To faculty – how will we know when teaching effectiveness is recognized as being of equal importance to research on this campus?
2. To students – without undermining the value of the degree you are working towards, what would it take to encourage you to learn more broadly, i.e., take risks as learners (and reduce focus on grades)?
3. To administrators and faculty – how can we show we are committed to lifelong learning for ourselves and our students?
4. To faculty – how can our students' experiential learning, both past and current, be deliberately leveraged to enhance the value of what they learn in your courses?

References

Ambrose, S.A., Bridges, M.W., DiPietro, M., Lovett, M.C., & Norman, M.K. (2010). *How learning works: 7 research-based principles for smart teaching*. San Francisco, CA: Jossey-Bass.

Association of American Universities. (2013). *Framework for systemic change in undergraduate STEM teaching and learning*. Retrieved from: https://www.aau.edu/sites/default/files/STEM%20Scholarship/AAU_Framework.pdf.

Barr, R.B., & Tagg, J. (1995). From teaching to learning: A new paradigm for undergraduate education. *Change, 27 (*6), 13-25.

Biggs, J. & Tang, C. (2007). *Teaching for quality learning at university* (3rd ed.). Buckingham: The Society for Research into Higher Education & Open University Press.

Celio, C. I., Durlak, J., & Dymnicki, A. (2011). A meta-analysis of the impact of service-learning on students. *Journal of Experiential Education*, *34*(2), 164-181.

Centre for Teaching Excellence External Review Self Study Report (2017). Retrieved from: https://uwaterloo.ca/centre-for-teaching-excellence/about-cte/annual-reports-and-external-review

Christensen Hughes, J. & Mighty, J. (Eds). (2010). *Taking stock: Research on teaching and learning in higher education*. Montreal & Kingston: Queen's Policy Studies Series, McGill-Queen's University Press.

Devlin, M. & Samarawickrema, G. (2010). The criteria of effective teaching in a changing higher education context. *Higher Education Research & Development, 29* (2), 111-124.

Education Advisory Board. (2018). *Undergraduate Student Learning, Carneghie Melon University*. Internal University of Waterloo report: unpublished.

Education Advisory Board. (2018) *Undergraduate Student Learning, University of British Columbia*. Internal University of Waterloo report: unpublished.

Education Advisory Board. (2018). *Undergraduate Student Learning, Wilfrid Laurier University*. Internal University of Waterloo report: unpublished.

Hall Giesinger, C., Adams Becker, S., Davis, A., Shedd, L., & New Media, C. (2016). *Scaling solutions to higher education's biggest challenges: An NMC Horizon Project strategic brief*. Volume 3.2.

Hamdullahpur, F. (2018). *Disrupting the 21st century university: Imagining the University of Waterloo @ 2025*. Retrieved from: https://uwaterloo.ca/president/sites/ca.president/files/uploads/files/ disrupting-the-21st-_century-university_accessible.pdf.

Kuh, G., O'Donnell, K., & Geary Schneider, C. (2017). HIPs at Ten. *Change: The Magazine of Higher Learning, 49* (5), 8-16, DOI: 10.1080/00091383.2017.1366805

Jang, H., Lasry, N., Miller, K., & Mazur, E. (2017). Collaborative exams: Cheating? Or learning? *American Journal of Physics, 85* (3), 223-227. DOI: 10.1119/1.4974744

Mitchell, A., Petter, S., & Harris, A. (2017). Learning by doing: Twenty successful active learning exercises for information systems courses. *Journal of Information Technology Education: Innovations in Practice, 16,* 21-46. https://doi.org/10.28945/3643

Ouellett, M. (Ed.). (2005). *Teaching inclusively: Resources for course, department and institutional change in higher education*. Stillwater, OK: New Forums Press.

Parker, J. (2010). Competencies for interdisciplinarity in higher education. *International Journal of Sustainability in Higher Education, 11*(4), 325-338. https://doi.org/10.1108/14676371011077559

Performance Indicators (2017). Co-operative Education. https://uwaterloo.ca/performance-indicators/co-operative-education-0/percent-fte

Performance Indicators (2017). New Hires. https://uwaterloo.ca/performance-indicators/faculty-and-staff/new-hires

Prosser, M., & Trigwell, K. (1999). *Understanding learning and teaching*. Buckingham: The Society for Research into Higher Education & Open University Press.

Reybold, L. E., & Halx, M. D. (2012). Coming to terms with the meaning of interdisciplinarity: Faculty rewards and the authority of the discipline. *The Journal of General Education, 61*(4), 323-351.

Strategic Plan in Action (n.d.). Experiential Education. Retrieved from https://uwaterloo.ca/strategic-plan/in-action/experiential-education?tab=all&tableau=1#tabs-nav

Strategic Plan in Action (n.d.). Outstanding Academic Programming. Retrieved from https://uwaterloo.ca/strategic-plan/in-action/outstanding-academic-programming?tab=all&tableau=4#tabs-nav

Svinicki, M. (2004). *Learning and motivation in the postsecondary classroom*. San Francisco, CA: Anker Publishing.

Warrington, E. (2017). Universally designing success in the classroom. *International Journal of Pedagogy & Curriculum*, *24*(2), 41-46.

Weimer, M. (2010). *Inspired college teaching: A career-long resource for professional growth*. San Francisco: Jossey-Bass.

Yancy McGuire, S. (2015). *Teach students how to learn: Strategies you can incorporate into any course to improve student metacognition, study skills, and motivation*. Sterling, VA: Stylus.

Appendix A: Issue paper process and methodology

To begin the issue paper process, the president, provost, deans, and other members of the Executive Council identified broad themes and issues that are vital to strengthening and advancing the unique value proposition for the University of Waterloo. The Executive Council identified faculty and staff to lead this initiative, while the Graduate Student Association and Federation of Students identified graduate and undergraduate student representatives.

Issue Paper Advisory members included:

> Advisory Group Members: Mario Coniglio (Chair, Associate Vice-President, Academic), Carey Bissonnette (Faculty of Science), Aldo Caputo (Centre for Extended Learning), Andrew Clubine (Federation of Students), Tara Collington (Faculty of Arts), Peter Douglas (Faculty of Engineering), Donna Ellis (Centre for Teaching Excellence), Anne Fannon (WatPD), Leeann Ferries (Faculty of Applied Health Sciences), Ross Johnston (Co-operative Education and Career Action), Carrie Mitchell (Faculty of Environment), Francis Poulin (Faculty of Math), Judene Pretti (WatCACE), Heather Westmorland (Student Success Office)
>
> Support: Daniela Seskar-Hencic (Institutional Analysis & Planning), Jana Carson (Institutional Analysis & Planning), and Annamaria Feltracco (Institutional Analysis & Planning), Kari Weaver (Library), Jodi Koberinski (Writer)

Through a series of five meetings between January and May 2018, the group defined the issue, developed a literature scan strategy executed by the Waterloo library, conducted an analysis of teaching and learning at Waterloo, developed the consultation questions, and provided feedback on drafts of the paper. This paper reflects the process engaged by the issues group and is not intended to be a comprehensive overview of all aspects of undergraduate learning at Waterloo.

To develop the Undergraduate Learning issue paper, the Issue Paper Advisory Group benefited from the foundational work of the Teaching and Learning Working Group. The current issue paper draws heavily from its content.

The Teaching and Learning Report synthesizes ideas generated in response to an invitation from our president, Feridun Hamdullahpur, to rethink teaching and learning at Waterloo as part of the preparation for our next institutional strategic plan. In July 2017, Mario Coniglio (Associate Vice President, Academic) and the senior teams in the Centre for Teaching Excellence and the Centre for Extended Learning met with the president to share ideas about what Waterloo could be doing differently in teaching and learning. Then in August 2017, the president shared a framework from the Association of American Universities (AAU) about systemic change for undergraduate teaching and learning. During the fall 2017 and winter 2018 terms, four half-day retreats were held to enable participants to explore and then distill ideas for Waterloo's near future in teaching and learning.[5] The Teaching and Learning Report documents the outcomes of this process.

[5] The participants in the retreats were: Mario Coniglio, Associate Vice-President, Academic, Senior staff from the Centre for Teaching Excellence (Donna Ellis [director], Veronica Brown, Trevor Holmes, Katherine Lithgow, Mark Morton, Mary Power, Svitlana Taraban-Gordon), Senior staff from the Centre for Extended Learning (Aldo Caputo [director], Dina Meunier, David Bean), Clare Bermingham (director of the Writing and Communication Centre), Judene Pretti (director of WatCACE), and Ron McCarville, Professor in Recreation and Leisure Studies and facilitator for all four retreats. These participants brought their expertise with the research and practice of teaching and learning to bear on developing the ideas in this report.

The Undergraduate Issue Paper Advisory Group considered what changes would be needed to make progress on adopting and advancing initiatives that address the principles from the Teaching and Learning Report, and fit with promising practices here at Waterloo and elsewhere. The group engaged in a facilitated discussion to generate ideas and strategies that could assist the institution in putting the principles into practice. Summarized ideas from this discussion are presented in the Strengths, Challenges, and Promising Practices sections of this issue paper.

The Issue Paper Advisory Group also considered information collected from a variety of other sources:

- University survey data on undergraduate learning, analyzed and reported by Waterloo's Institutional Analysis and Planning unit;
- a summary of interviews with peer university stakeholders to address key issues within undergraduate learning, developed by the Educational Advisory Board (EAB); and
- a literature scan and synthesis based on questions developed by the Undergraduate Issue Paper Advisory Group and conducted by Waterloo's library staff.

Finally, an important element of this work was a facilitated group process to identify vital issues in undergraduate learning with the Issue Paper Advisory Group.

This methodology was developed not to create a comprehensive understanding of undergraduate learning, but rather to highlight and explore the most important issues identified by key University stakeholders.